

AMENDMENTS IN THE SPECIFICATION

Please correct the title of the above identified application accordingly:

GAS MIXTURE, IN PARTICULAR FOR INFLATING THE ~~TYRES~~ TIRES OF VEHICLES

On page 1, please insert the following paragraph after the title:

This application is a national stage filing under 35 U.S.C. 371 of International Application PCT/US2004/000021, filed on January 28, 2004. International Application PCT/US2004/000021 was published under PCT Article 21(2) in English.

Please replace page 1, lines 8-19 with the following:

This-invention concerns a gaseous composition particularly suited for use in inflating the ~~tyres~~ tires of vehicles.

More in particular, this invention refers to a gaseous composition which is designed to be used to inflate the ~~tyres~~ tires of vehicles to achieve improvements from the point of view of performance and the overall life of the ~~tyre~~ tire .

This invention can be applied in the industrial sector for[[']]the production of non-combustible gases, and in particular in the production of gas mixtures for the inflation of ~~tyres~~ tires.

Please replace page 1, lines 22- page 3 line 4 with the following:

It is known that the ~~tyres~~ tires of vehicles are inflated with compressed air which is injected into the. inner chamber of the ~~tyre~~ tire through the valve, until the correct working pressure is reached.

It is also known that in the event of long road journeys especially in the summer or in the case of extreme conditions, such as during competitions with sports vehicles, the ~~tyres~~ tires tend to overheat and the pressure to increase. The hot air in the ~~tyres~~ tires tends to damage the structure of the ~~tyre~~ tire due to oxidation and ozonolysis phenomena.

These phenomena produce dangerous and uncontrollable effects on the ~~tyres~~ tires , which after ~~travelling~~ traveling a certain distance on the road or track undergo a sudden drop in performance, with a considerable limitation in the life of the ~~tyres~~ tires as a result of mechanical and thermo-oxidative stress.

Please replace page 2, line 5- page 3 line 1 with the following:

In particular, according to the results of standard length track tests, it was found that vehicle ~~tyres~~ tires normally inflated with compressed air traditionally undergo a sudden drop in performance after the sixth or seventh lap, continuing to decrease and making frequent gear changes necessary.

To overcome this limitation in the performance of air-inflated ~~tyres~~ tires , the use of gas mixtures was tested and a series of gases were selected on the basis of various properties.

The use of these gases or mixtures did not, however, lead to appreciable results, and it was found that ~~tyres~~ tires traditionally inflated with these nitrogen, helium or argon-based gaseous mixtures, and the ~~tyres~~ tires of track sports vehicles, also undergo a sudden drop in performance after a certain number of laps, making it necessary to replace them after a short time.

In fact the critical temperature for some racing ~~tyres~~ tires is 130°C, over which the ~~tyre~~ tire "shatters", in other words the part which would normally be worn out on the asphalt surface becomes detached from the ~~pressurised~~ pressurized chamber.

The construction of ~~tyres~~ tires with this known technology is carried out in two stages: the first being the pressure chamber, the second the rubber mix, which is worn out on the asphalt.

When the two parts are superimposed and ~~vuleanised~~ vulcanized, small air bubbles could remain trapped between the two parts, and an increase in temperature over 130°C would cause them to increase in volume finally forming blisters that would inevitably explode.

Please replace page 3, line 4 - page 3 line 32 with the following:

This invention proposes to provide a gaseous mixture or composition that can be used to inflate the ~~tyres~~ tires of vehicles, thus obtaining improvements from the point of view of performance and of the overall life of the ~~tyre~~ tire, by controlling the-temperature, thus eliminating or at least reducing the disadvantages described above.

The invention also proposes to provide a gaseous composition that be easily produced, thus making it economically advantageous.

This is achieved by means of a gaseous composition for the inflation of vehicle ~~tyres~~ tires and having the features described in the main claim.

The dependent claims describe advantageous embodiments of the invention.

The gaseous composition according to the invention presents a first fundamental feature, a high capacity of heat transfer. This is therefore a gas mixture that is able to effectively conduct

the heat from the rubber ~~tyre~~ tire during rotation to the wheel rim. The latter, particularly when made from ~~aluminium~~ aluminum or magnesium, acts as a radiator, exchanging the heat with the outside air, preventing the ~~tyre~~ tire from becoming overheated.

Thanks to the high capacity of heat transfer, ~~tyres~~ tires inflated with this gaseous composition achieve excellent results from the point of view of their life, since the temperature of the ~~tyre~~ tire is kept low and the pressure is constant. This ~~minimises~~ minimizes damage due to oxidation and ozonolysis, thus extending the life of the ~~tyres~~ tires subjected to mechanical and thermo-oxidative stress.

Please replace page 4, line 28- page 5 line 31 with the following:

First of all, ~~tyres~~ tires inflated with this mixture have a constant performance, and the sudden drop in performance does not occur (graph 1). A certain drop in performance was, however detected, but is more gradual and above all occurs after around 11 or 12 laps.

The use of the mixture according to the invention in ~~tyres~~ tires fitted on motorcycles keeps the pressure more or less constant, reducing the vibration phenomena which are felt above all on the front ~~tyre~~ tire (chattering effect).

The rotating mass below the shock absorbers normally has a disturbance frequency of 15-18Hz, while the more constant pressure achieved with this mixture makes it possible to damp this effect, reducing it to 7-9Hz, (data taken from superimposed telemetric systems).

The working temperature also remains below the critical threshold. When the mixture according to this invention is used, the temperature of the ~~tyre~~' tire ever increases beyond 120°C. This is a very important fact considering that the critical temperature for some racing ~~tyres~~ tires

is 130°C, over which the, ~~tyre~~ tire "shatters", i. e. the part that is normally worn out on the asphalt becomes detached from the ~~pressurised~~ pressurized chamber.

The new mixture according to the invention absorbs the temperature and transmits it to the wheel rim which acts as a radiator, keeping the temperature of the ~~tyre~~ tire "low" by exploiting the high heat transmission coefficient of the gas combination which transmits and dissipates the temperature by conduction.

With the new mixture according to the invention, the ~~tyre~~ tire is subject to less wear, the shavings are four times smaller compared to those with an air-inflated ~~tyre~~ tire and after a race a mixture-inflated ~~tyre~~ tire loses half the weight compared to an air-inflated ~~tyre~~ tire .

Thanks to the use of the mixture according to the invention, it will also be possible to manufacture softer ~~tyres~~ tires , improving the "grip" and the consequent lap time for competition vehicles, guaranteeing the team a better performance with respect to other ~~tyre~~ tire manufacturers.

Please replace page 6, lines 1-7 with the following:

become evident on reading the following description of one embodiment of the invention, given as a non-binding example, with the help of the enclosed drawing, in which figure 1 is a graph representing the performance of ~~tyres~~ tires in relation to the laps covered on a standard length track in the two conditions of inflation with air and with the gas mixture.

Please replace page 6, lines 10-12 with the following:

The gaseous composition according to the invention suitable to be used to inflate vehicle ~~tyres~~ tires consists of a mixture of hydrofluorocarbons.

Please replace page 6, lines 30 – Page 8, line 10 with the following:

The achieved effects of the mixtures refer mainly to a more constant temperature of the inflated ~~tyres~~ tires, a more constant pressure and the possibility of using softer mixes, and consequently providing better track performance.

First of all, ~~tyres~~ tires inflated with this mixture have a constant performance, with no sudden drop, as can be seen in the diagram in figure 1.

As this diagram shows, a certain drop in performance was noted, but this is more gradual and above all it occurs after around 11 or 12 laps.

The table below indicates the data relative to the ~~behaviour~~ behavior of ~~tyres~~ tires inflated with various gas mixtures and subjected in an artificial environment to temperature and pressure tests on the basis of the test time measured in minutes.

The tests were carried out only on rear ~~tyres~~ tires since they are more subject to temperature problems.

During the tests the ~~tyres~~ tires were rotated for a period of time at a certain speed; the speed was then increased until the ~~tyres~~ tires burst.

The tests were accordingly carried out by rotating the ~~tyres~~ tires on a surface with a load of 162 kg at an ambient temperature of 25°C and at increasing speeds: for the first 20 minutes at 115 kmph and for subsequent intervals of 10 minutes at increasing speeds from 230 to over 300 kmph.

The first column in the table indicates the various mixtures used in the two rear ~~tyres~~ tires.

The second column indicates the temperatures of the ~~tyres~~ tires after 60 minutes of testing and the third column the ~~tyre~~ tire pressure after 60 minutes.

The fourth column indicates the temperature values when the ~~tyre~~ tire bursts and the fifth the time in minutes after which the ~~tyre~~ tire burst, while the sixth and last column shows the pressure in bars at the time of bursting.

As can be seen, the mixture giving the best performance is the one indicated in the seventh and the eleventh line, consisting of 50% of 404 and 50% of CO2.

The results measured with the use of this high- performance mixture indicated the longest times at ~~tyre~~ tire bursting, i. e. 103 and 117 minutes, which are higher than all the other values.

At the end of the test period, the high-performance mixture made it possible to increase performance by 22. 1%, and the ~~tyres~~ tires burst at a much higher speed, this result being achieved by a lowering of the temperature according to the essential features of the new mixture, and by maintaining the pressure at the inflation values.

Please replace all spellings of “Tyre” within the table at page 8, lines 10-15 with the spelling of “Tire”

Please replace page 8, lines 17 – Page 9, line 25 with the following:

Once the most suitable mixture had been found, the ~~tyres~~ tires were analysed to check whether the mixture could have damaged the elastomer or its components in any way.

The perfect integrity of the elastomer and its main components was confirmed and, thanks to solid state high resolution NMR spectroscopy, the various samples inflated with the various gases and mixtures were compared. These tests confirmed that the sample inflated with the high- performance mixture gave the best results, minimising the damage due to oxidation and ozonolysis, extending the life of the ~~tyres~~ tires subjected to mechanical and thermo-oxidative stress.

The gas mixture according to the invention can be used in the ~~tyres~~ tires of airplanes, trucks, articulated trucks, buses, cars or other vehicles, with greater performance in terms of life, rotating silence and lower fuel consumption due to the more stable conditions inside the chamber, all in total safety since the mixture is completely inert. Especially for heavy vehicles, this means that in the event of a ~~tyre~~ tire catching fire, as a result of its bursting and of the high temperature, the gas would extinguish the fire.

As can be seen, this gas mixture makes it possible to achieve all the results described above, including above all those relative to the fact that the ~~tyres~~ tires inflated with this mixture give a constant performance and the traditional sudden drop in performance does not occur.

Please insert the Abstract, appearing on the following page, immediately after the last page of the claims.